Information Technology Interoperability Standardization and Quality for Justice/Public Safety/Homeland Security

Outputs

- XML Data Model and Data Dictionary.
- Audio quality testing.

ITS is conducting a technical program aimed at facilitating effective interoperability and information sharing among dissimilar information systems within the justice/public safety/homeland security community, and ensuring that there are standardized procedures to measure the quality of speech delivered through public safety's communications systems.

The primary focal points of the information technology (IT) interoperability portion of the program are: (1) the identification and delineation of applicable information sharing architectures, (2) coordination between major Federal players and local and state public safety practitioners to collegially develop a nationwide strategic plan for information sharing, and (3) the identification and/or development of standards that address the community's requirements and are in conjunction with the strategic plan. All efforts are aimed at allowing local, State, and Federal agencies to exchange information, without requiring substantial changes to internal systems or procedures.

The focal point of the audio quality portion of the program is to provide a facility that can emulate, in a controlled laboratory environment, the field conditions experienced by public safety practitioners.

The ITS program is sponsored by a number of different Federal departments and programs that have a keen interest in public safety interoperability, including: National Institute of Standards and Technology (NIST) Office of Law Enforcement Standards (OLES), Department of Homeland Security's Public Safety Wireless Communications (SAFECOM) Program, Department of Homeland Security Chief Information Officer's Wireless Management Office (WMO), Department of Justice Office of Community Oriented Policing Service (COPS), National Institute of Justice (NIJ) CommTech Program (formerly AGILE Program), and NTIA.

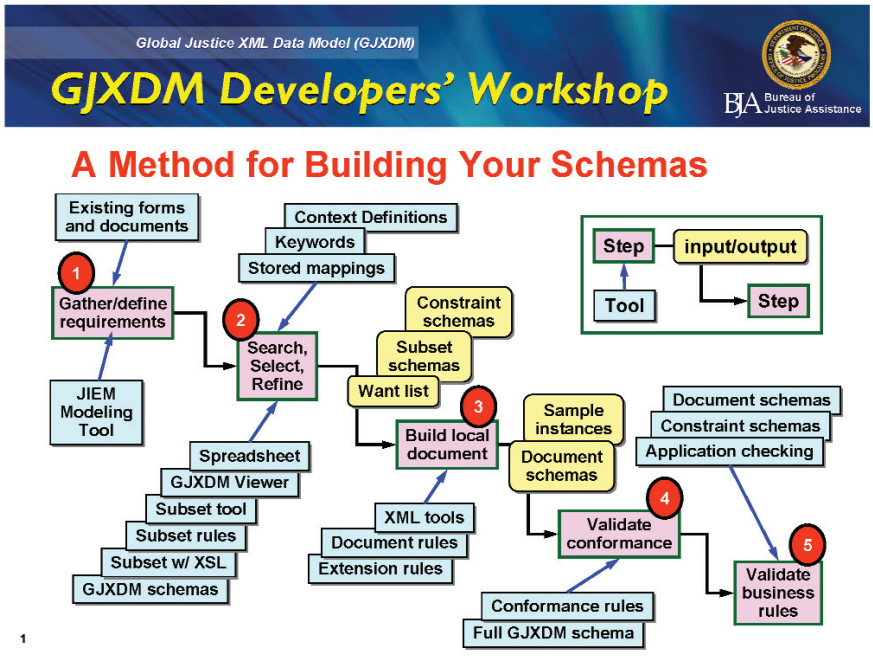

Figure 1. Structured process for GJXDM Exchange Document Development.

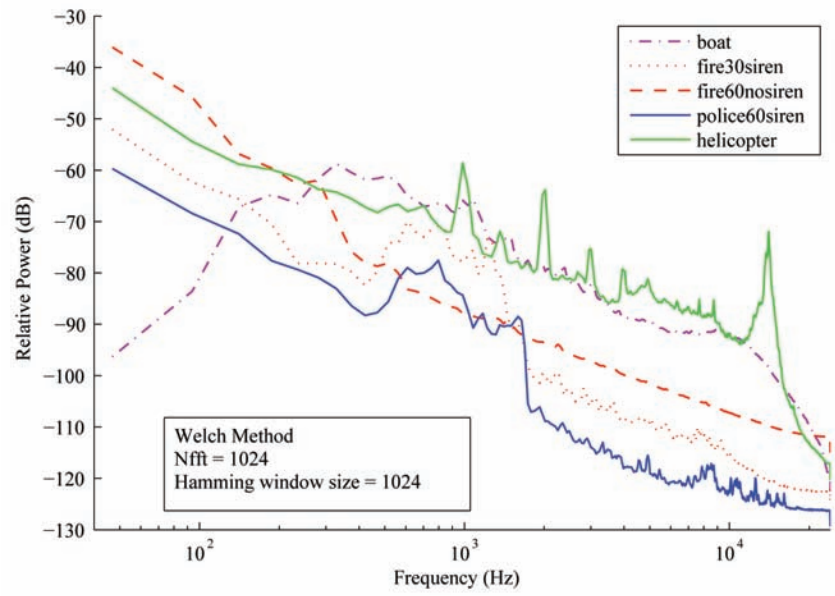

Figure 2. Noise spectra of public safety operating environments.

XML Data Model and Data Element Dictionary Development

In prior years, ITS played a significant role in providing technical assistance and coordination in the initial development of an Extensible Markup Language (XML) Data Element Dictionary that can provide common "words" for a common "language" to be used by the justice/public safety/homeland security community. The public release of the Global Justice XML Data Model (GJXDM), the data dictionary along with an associated data model, was in 2004.

While the release of the GJXDM was a significant step forward in achieving information sharing interoperability among members of the justice and public safety community, it is a very complex model. Thus, FY 2005 efforts primarily focused on training and education related to the data model. This includes guidance for structured development of documents to be exchanged, and messages to be passed, shown in Figure 1 on the previous page. Users and developers use the "words" of the Data Dictionary to build documents that represent a particular information exchange. The current released version of the GJXDM is available to the public at http://it.ojp.gov/gjxdm/.

The next phase of development for the XML data model was identified in 2005: the National Information Exchange Model (NIEM). The NIEM uses the foundation of the GJXDM to extend the architecture of the data model to the broader context of Justice and Homeland Security. The first public version of the NIEM is expected in 2006.

Audio Quality Testing for Public Safety

There are several reasons for developing high-quality acoustic coupling capabilities to provide speech stimulus to public safety communications devices. One is that the electrical interfaces are non-standard and highly specific to each manufacturer and/or device model. Another is that acoustic coupling provides a means to perform calibrated laboratory emulation of the acoustic environment experienced in the field.

One of the most severe challenges that public safety practitioners face is the extreme nature of the environment in which they must operate. Of particular impact to speech quality is the variety and volume of noise environments. Public safety equipment operates at high noise levels with disparate noise spectra even before the inclusion of application specific features such as sirens (see Figure 2 above). These make for very challenging communication scenarios.

The first subjective test to evaluate public safety practitioner opinion of quality in the presence of real public safety background noise was conducted in 2005. The test was specifically requested by the Project 25 Steering Committee for the purpose of evaluating enhancements in vocoder technology since the initial adoption of a Project 25 standard vocoder in 1998. The test results showed that there had been significant improvements in quality that would not impact interoperability, and based on that information, the Project 25 Steering Committee immediately moved to adopt the newer, higher-quality, version of the vocoder.

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